

Productive measures: Culture and measurement in the context of everyday neoliberalism

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Abstract

This article reflects on how data circulations and data analysis have become a central and routine part of contemporary life; it does this through the lens of a particular cultural form: the game of football. More specifically, the article focuses upon the role of data in the production and playing of football, with the suggestion that forms of measurement and pattern recognition are now central to the performance of footballers and the recruitment and organization of squads. The article reflects on what this case study reveals about the implications of data, metrics and analytics for contemporary culture and suggests that we can use examples like football to see how embedded these data-processes are in the social world. This article presents the concept of *productive measures* as one means for analysing such developments.

Keywords

Culture, data, neoliberalism, Big Data, measurement, circulations

There has been much talk recently of ‘Big Data’ and its implications for both social research and for the social world itself – this is understandable given the scale of the rhetoric and the potency of their imagined implications (for a definition and outline of the Big Data phenomenon see Kitchin, 2014: 67–80). This Big Data is imagined as both a source of renewed possibility for social researchers and the basis upon which the very fabric of the social world is being reconfigured. In the latter of these cases, Big Data can potentially be seen to be central to the workings of contemporary capitalism and, possibly, as a resource, facilitator and mechanism for the spread of what Brenner et al. (2010) refer to as the processes of ‘neoliberalization’. Big Data provides the measures by which competition and markets can unfold. Against this backdrop, this article attempts to see Big Data as an established and integrated part of contemporary culture. Such an approach allows us to explore the ways in which these data are already playing a part in shaping and defining the social world. That is to say, this article is concerned with how deeply embedded digital data already are in systems of measurement, in social ordering and in the performance of the social world.

When we pause to look closely it is possible to reveal this vast interweaving of new types of data within the fabric of social processes. This article takes an ordinary part of popular culture, football, and shows how new forms of data have steadily redefined this particular game. Rather than seeing this as a sudden rupture or moment of change, this example is telling of a longer scale shift in the use of metrics in sport and the more general reliance upon statistics and probability calculations in the ‘taming of chance’ (Hacking, 1990). As I will describe, these explorations do not suggest that metrics have suddenly become a central part of culture, rather it suggests that what we are seeing is an intensification of processes that have a long history. Through football, as a global sport played and watched by millions, we might then begin to see just how significant these apparently new types of ‘big’ or by-product data

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might be for culture on a larger scale. That is to say that we might see how Big Data, as it is now most often referred to, is not something out-there but is instead, inherently, an established presence in our everyday cultural lives. Alongside this, football is a useful example for two further reasons. First, it is data heavy in the way it has come to be run and consumed, so it gives us a sort of archetypal cultural data assemblage with which to work. Second, the mass-consumption of football, through and within its changing infrastructures, allows us to explore how consumer capitalism is being reshaped by data and how this translates directly into everyday experiences.

We might begin by suggesting that football, as a contemporary cultural form, exemplifies a kind of 'everyday neoliberalism' (Mirowski, 2013). In his key book on the survival of neoliberal political formations after the global economic crisis, Philip Mirowski argues that part of the reason for the endurance of neoliberalism is its embeddedness in the everyday. Mirowski's work is highly historically sensitive so this should not be read as being neoliberalism's unexpected or sudden moment of glory, rather Mirowski is situating everyday neoliberalism in a history of political governance which he argues is now so embedded that it has seeped into the everyday. Mirowski (2013: 154) points to the importance of our 'brushes with neoliberalism on a granular scale'. From this perspective the everyday is infused with neoliberalism. Mirowski (2013: 89) argues that 'a kind of "folk" or "everyday" neoliberalism has sunk so deeply into the cultural unconscious that even a few rude shocks can't begin to bring it to the surface long enough to provoke discomfort'. For Mirowski there is no single market or notion of competition that becomes dominant, but rather neoliberalism is translated into everyday practices and notions of self. As such, Mirowski (2013) suggests that we should attempt to understand the 'contours of neoliberal consciousness' and that we should 'explore the accretion of neoliberal attitudes, imaginaries, and practices that have come to inform everyday life' (pp. 91–92).

The discussions offered in this article have a kind of subtext: the focus is upon the role of data, metrics and analytics in culture: but in the background this article can also be read as an attempt to explore the 'contours' of 'everyday neoliberalism' as they play out in particular social spheres and as systems of measurement and competition become a routine part of everyday attitudes, imaginaries and practices. In other words, we have the complex history of neoliberalism (see Gane, 2014) in its various ongoing uneven and specific 'reconstructions' (Peck, 2010: 6) running alongside the history of the emergence of 'statistical thinking' (Porter, 1986) in culture and sport.

As this would suggest, and although it is sociologically interesting in its own right, this article is centrally

concerned with football only in so far as it allows us to understand the role of these new types of digital by-product data and their wider implications for culture. Its value as a case study is in allowing us to see the circulations of these data and to understand how new forms of measurement and calculation are now integrated into, or will come to be integrated into, everyday cultural experiences. Matthew Fuller, Lisa Adkins and Celia Lury (2012: 6) have claimed that data 'surpluses are routinely harvested and put to work in new ways, including in novel forms of value creation'. They continue by arguing that 'rather than being inert or dead, in the contemporary social world data is brought into existence as active or "alive"' (Adkins and Lury, 2012: 6). Indeed, it has been suggested that there is an emergent 'politics of circulation' in which data have come to recursively fold-back into and reconfigure culture (Beer, 2013). Football is an example that can be used to, at least partially, make visible this 'politics of circulation'. Plus, aside from noting the importance of sporting analogies in neoliberal rhetoric (Davies, 2014: 43) – with the league table proving particularly powerful in affording neoliberal forms of marketised competition (Gane, 2012: 79) – football is an example that illuminates the generation, accumulation, filtering, archiving and sorting processes of data in different forms and is therefore suggestive of how the broader social world is coming to potentially be reworked and reconstituted by data and metrics. To sensitise us to such processes, and to enable us to think through the ways in which measurements produce and cajole as well as capture and envision, this article will begin to develop the concept of *productive measures*. This concept considers not just what can be measured and how, but it can also be used to reflect upon how these systems are presented, marketed and understood. The concept of productive measures is aimed at understanding the exchanges between emergent systems of measurement and the neoliberal attitudes, imaginaries and practices to which Mirowski refers.

Productive measures

It may seem odd to suggest that the way that culture is produced, or in this case the way a sport is played, can be reshaped and reworked by data. In fact we can place such an argument within a long tradition of work on the history of statistics; in his influential work in this area, for example, Ian Hacking (1990) talks about statistics and classifications 'making people up'. This broad line of argument is also actually entirely in keeping with much of the most revealing recent work on digital or Big Data. Data and analytics are often understood to be powerful in enacting or constituting the social world. This core

premise has been argued in a variety of ways. There is a sense that there is an ontological shift at play as data and analytics become a central part of the functioning of the social. Louise Amoore's recent book is one particular highlight. In this text, Amoore explores the way that notions or visions of what is possible come to shape preemptive decision-making processes – here we find a break from the earlier work on probability in the move to understand how metrics predict possible outcomes. Amoore (2013: 9, *italics in the original*) describes her book in the following terms:

The specific modality of risk that I address in the chapters that follow has an anticipatory logic: it acts not strictly to *prevent* the playing out of a particular course of events on the basis of past data tracked forward into probable futures but to *preempt* an unfolding and emergent event in relation to an array of possible projected futures. It seeks not to forestall the future via calculation but to incorporate the very knowability and profound uncertainty of the future into imminent decision.

Amoore's book is concerned with how data are used to project imagined futures that are then used to inform decision-making processes; thus, data and predictive analytics of different types become a part of practices, decisions and social outcomes. Again, this is not so much a rupture as a set of analytic opportunities that are seen to be found in new types of data. From this perspective, data analytics do not just shape what is known, they also shape what is knowable. This is not about what is probable, but what is possible – hence Amoore talks of 'the politics of possibility'.

There are other prominent examples of these types of constitutive arguments. Scott Lash (2007), for instance, has argued for the role of data and algorithms in new types of, what he calls, 'post-hegemonic' power. Elsewhere, in geography, Kitchin and Dodge (2011) have built a persuasive case for the centrality of data and code in the functioning of contemporary 'code/space', with software modelling shaping social outcomes and ordering practices. Adrian Mackenzie (2006) and others (including Fuller and Goffey, 2012) have argued for the need for software studies to be part of broader conceptions of the social world – these include accounts of how software and code come to order the social in various ways. The list could go on, but for purposes of brevity we might accept for the moment that there is an emergent and increasingly broad interest in the *constitutive power* of data, software and analytics.

This wave of interest in the constitutive power of data, software and code is increasing as it becomes

clear that data are, in a number of ways, central to the make-up of contemporary social formations of different types. Despite this excellent emergent body of literature, we are still only at the foothills in our critical analysis of the role of data in culture and society. The scale of these changes would appear to far outstrip the existing analytics; as a result we are likely to feel that we are playing catch-up. Thanks to the existing work, and also to other insights into 'the social life of methods' (Ruppert et al., 2013) – which argues for an understanding of how methods and forms of analysis have moved outside of research practices and into the social world – we are in a position to continue to open-up these potential social transformations and the implications of the apparent rise of data and analytics.

As Ajana (2013) has pointed out though, it is not that these forms of measurement have come from nowhere. Instead she argues that biometrics of different sorts have long histories. Ajana suggests that transformations in media and the processes of digitalization have simply altered the capacity and scope of these systems of measurement (see also Beer, 2014; Higgins and Lerner, 2010: 14). As Ajana (2013: 21) puts it, we are actually seeing the 'remediation of measure'. Ajana explains, there is a need:

to challenge the label of newness that is often stapled on [biometrics] and to draw attention to the fact that the body has for so long been the subject of control, measurement, classification and surveillance. The digitalisation aspect of biometrics has certainly intensified such processes and opened up the body to further dynamics of power and control. (Ajana, 2013: 45)

For Ajana, as a result of a range of developments, we are seeing an *intensification* of systems of measurement, yet these systems have a very long genealogy (see also Crampton and Elden, 2006). Indeed, if we turn to something like Michel Foucault's 1977–1978 lecture's on *Security, Territory, Population* (Foucault, 2007) it is clear how historically embedded the connections are between forms of 'calculation', 'techniques of power' and the 'art of government'. These connections feature throughout the lecture series from 1977 to 1978, but they are dealt with most directly at the beginning and end of the course – most notably in relation to the use of statistics, measurement and statistical apparatus in the early lectures and culminating in the final two lectures with a focus upon questions of competition, the use of statistics in defining interests and the emergence of circulation and a 'circular ontology' (for a detailed reading of Foucault's lectures in relation to calculation, see Elden, 2007). Foucault (2008) notably returns to and extends these themes in his analysis of the genealogy of neoliberalism in the following year's lecture

course on biopolitics. What we are dealing with here then has both a technical and political history (which has been elaborated in terms of population metrics by Ruppert, 2011). At the same time though, new possibilities and opportunities are emerging for the integration and expansion of such techniques and interests as a consequence of some key changes in the infrastructures and mediation of everyday life. When thinking of *productive measures* then, we are thinking of the intensification of systems of measurement along with the rise of powerful data infrastructures and the constitutive and productive power that these systems of measurement might have for the way that the social is performed. These productive measures do not emerge from nowhere; we would expect them to be situated in this technical and social history of emergence and intensification. To add to this, if we combine the noted observations about the constitutive power of data and data analytics together with conceptions of neoliberal governance then we have a pressing and potentially profound cocktail of developments with which to concern ourselves.

Football, data and metrics: Playing games through data

In the case of football the constitutive powers of data are highly visible. Even tuning in to a football phone-in or listening to the commentary on a game we are presented with innumerable examples of statistical thinking. Metrics and statistical insights filter into the way the game is talked about and reveal a type of everyday neoliberalism that has sunken into this popular cultural form. The way the game is discussed and presented is now very stats heavy, from the mistakes made or cautions handed out by referees to the historical and comparative performance of managers and on to the tracking of players' actions and movements. The coverage of football and its discourse are full of metric based differentiations – and, of course, football is not the only sport that is like this. The game of football is undoubtedly changing as a consequence of the presence and use of data. The influences take numerous forms. The way that metrics influence how the game is understood in turn fold-back into fan reactions and organizational decisions in quite complex and interwoven feedback loops. Data are game changers. What is most difficult to appreciate is how data are used, like catalysts, in recursive and recombinant processes and systems. Data are drawn from the game, which then informs how the game is played and consumed, which then finds its way into the data, and so on. . .

To give some sense of the scale and embedded role of data analysis in the performance of football, we can turn first to the structures of the clubs themselves.

Just by way of an opening illustration, if we begin with the top four teams as they finished in the top division in England in the previous season we find that all four clubs have embedded teams of data analysts in their coaching set-ups.¹ The club staff profiles show that these individuals and departments play a central part within the clubs' organisation and coaching, often catering for first team coaching through to their youth academies. Frequently, these public profiles link data analytics with performance management and team improvement. I will speak about the data analysis company Prozone in a moment, but, as an example, one of the top four clubs employed a former Prozone employee for their own in-house data analysis. Another club had a performance analysis department, with the express purpose of using statistics to shape team performance. This club even hosted a series of videos of this data analysis department in action, showing how they used statistics before, during and after games in order to refine performance. Half-time even provided opportunities for the data analysis to be a real-time part of the game as it unfolded, with interactive whiteboards used to communicate the analysis to the players. The videos show how players are given the analysis and how they then use it to shape their performance, with one player commenting on how he discovers whether or not he has played well from the post-match statistics. Indeed, the remaining two clubs both had dedicated teams of performance analysts. The exact role of these analysts was less clear for one club but was more visibly integrated into the coaching techniques of the other. In this later case there was a team of analysts with defined roles and management structure. There is even a notable visual dimension to the analytics, with statistics often used alongside video – and with one club even employing a specialist in visualization to enable the data to be used in different visual forms. Smartboards, iPads and other devices were used to provide the players and managers with key analytics and the means for their communication.

All of the top four teams had data analytics built into their coaching structures, and all made this visible through their public profiles – with one club even showing exactly how these analytics were used. Data analytics are not just a part of the actual set-up of these clubs, they are also a part of how they publicly present themselves. It would seem that they aim to be seen to be cutting-edge in their use of analytics. It is important to add though that data analytics are not simply the domain of top-level elite clubs. The pattern continues for other smaller clubs, albeit on an apparently different scale. Selecting two teams from the fourth tier of English football, based upon their being located in areas where the author has lived, both clubs had performance analysts included in their

coaching staff,² one of which was expressly involved in using statistics and data to aid team performance. Across the sector it would seem that the role of such analysts is to ‘boost . . . competitive performance’, a role that Will Davies (2014: 67) suggests is typical of organizations that are defined by the conditions of neoliberal competition.

On top of this, and extending the reach of such metricisation beyond professional football, items such as Adidas’ trackable football boots mean that anyone owning such an item can become their own football performance data analyst as the ‘quantified self’ (Lupton, 2013) combines with the codified ‘permeable logject’ (Dodge and Kitchin, 2009). Similarly, football data sites, such as StatsBomb, provide the means for fans to also be data analysts themselves. StatsBomb.com provides data analysis insights of different types through its group of analysts and writers. The site provides a range of data analytics; these include visualisations of individual players’ performances across a range of core metrics (such as goal conversion rates, through balls, the number of times they were dispossessed and so on). There are also dynamic maps that show the movement of players during matches; here players are represented by dots that move around the pitch and as they are involved in the play the size of the dot increases. The glossary of StatsBomb’s data shows that they also use metrics ranging from shot dominance, shooting accuracy through to assists and other more complex statistics about the performance of the defence that takes account of ball possession. This would seem to be an invite to play with the data and to be your own analyst.

The above is suggestive of the influence of data in the organisation of football clubs and team performance, but what about its influence on the players themselves? This is a more difficult territory to explore, and I will only touch upon it in this article, but we can turn here for some sense of the possibilities to the Secret Footballer, an anonymous professional footballer who writes for *The Guardian* newspaper. In an article published in *The Guardian* on 13 April 2012, the Secret Footballer spoke of his experiences of data in the game. He began by linking the changes he had seen in football with those that had already taken place in baseball:

The Moneyball philosophy first used by the Oakland A’s general manager Billy Beane is the study of a set of underestimated statistics that are then used to find undervalued baseball players in the transfer market. Soccernomics, the football equivalent, is the analysis of a similar set of numbers used to give teams a competitive edge.

The well-known Moneyball philosophy is based upon using data to find and uncover what is

understood to be hidden value. The idea being that players who are either undervalued or who will come to have value later in their careers can be identified early on and thus traded below their market rate. This approach uses whatever metrics are available, which has drastically escalated in recent years, to illuminate potential value (with the speed of decision-making being crucial, as with the velocity of high speed trading described by Mackenzie, 2014). The result is that decision-making processes are altered by the presence of data. The sense is that data can be used to inform decisions and that this is seen to be a more objective and analytically accurate approach to decision-making. In other words, there is a sense that reducing the need for human intuition, discretion and agency can lead to decision-making being more accurate and value-generating. There is a faith here in the numbers, or as Theodor M Porter (1995: 8) has put it, a ‘trust in numbers’ and ‘faith in objectivity’. Here we see the conditions in which such faith and trust are able to thrive. Indeed, a recent discussion of the role of data in football on BBC radio 5Live on 2 February 2015 revealed some further details of the integration of data in the life of the footballer. The discussion, which involved two recently retired players and one current player, revealed some of the ways in which the presence of metrics shaped players’ behaviours. It was suggested that players play the game in order to improve the metrics and that there was something of a burgeoning obsession with performance metrics. The pass completion statistic in particular was noted as being important, with players choosing safe short passes in order to increase pass completion statistics. Similarly, it was suggested that what was described as an ‘intensity’ measure – which related to prolonged sprints – was also a particularly prominent stat and something of a bugbear that could be manipulated by certain movements on the pitch. An existing football coach suggested that data analysts had a powerful role in decision-making practices in many clubs, with their analysis being used to make decisions about team selection and the like.

Similarly, the Secret Footballer continued by describing how this type of metric-based approach and philosophy had come to shape the game they are part of:

When Liverpool failed in a bid for Gaël Clichy, it was reported that Comolli turned to José Enrique after discovering that his statistical figures were far more impressive than Liverpool’s scouting report suggested. He was also much cheaper than Clichy in terms of the transfer fee and salary. What stood out about José Enrique, supposedly, was that he had one of the highest pass completions and entries into the final third; he

could also be credited with having a direct hand in many of Newcastle's goals.

Again, this description illustrates how data became central to highlighting perceived value and in decision-making. In this case, the data used came to influence the players who made-up a particular squad. The use of metrics in this case led directly to an alteration in playing staff. One player was seen in a new light as a result of data about pass completion rates, field position and so on. In a separate instance, the Arsenal manager Arsene Wenger admitted that statistics were used in the decision over the transfer of Gabriel Paulista (Pitt-Brooke, 2015). It is interesting to note that the interview about the Paulista transfer reveals that the quality of the statistics was important but only in so far as they reinforced the 'eye' of the coaches. It is interesting to note too, alongside my earlier observations about the coaching structure of leading football clubs, that Arsenal have been reported to have purchased a data analysis company in 2012 (Hytner, 2014) – the descriptions of the analytics offered by it suggest that the analysis is taken beyond things like goal assists to see if the pass was accurate enough that the player receiving it did not have to break stride and so on. Here we have data directly shaping a financial decision, with economic consequences, and also directly shaping the game itself. Data analysis here is used to find what is understood to be hidden value and to exploit it for market position and a competitive edge.

The above is suggestive of how data are used in the transfer business; the Secret Footballer also suggests that these data are used to shape gameplay itself. In this case, data about football are used to inform how players are coached and ultimately to reinforce or change playing practices – with echoes of my earlier observations made about analysts in coaching staff structures. As the Secret Footballer describes, '[i]n open play, a huge amount of study, from my own experience at clubs, is devoted to the calculation of what are described as final third entries, penalty box entries and regains of the ball in the final third'. In this case, data extracted from football games are used to explore what is successful. Then the patterns that represent success are used to coach and shape playing practices. The direct aim is no longer to score a goal, for example, but instead players are coached to aim for a certain number of passes or final third entries. Defensively they might be coached to head the ball to certain places from crosses and so on. The result is that players' behaviours are directly shaped by the data and their uses, sometimes based on the team-play and other times on individual practices. The picture is of a game that is managed, and sometimes potentially

micromanaged, by metrics. Players are coached to follow the patterns of success that are found in the data. The coverage does not end there, with further indications that teams are seen to be drawing widely upon expanding data sets (Hudson, 2013; Siu, 2013) – with some even asking if the human agency involved in football club decision-making might be usurped by those with the skills to find patterns in Big Data (Lee, 2014). Of course, not all clubs will be run or coached in the same way; there is likely to be resistance or defence of values, as with Wenger's assertion of the role of the 'eye' in decision-making, but this gives a sense of the scale of influence that data have in the production of a football matches. Playing the game, it would seem, is about playing the stats. This leads us to consider the scale of the data assemblage in football and the industry of analytics that has emerged.

Productive measures in organisations and structural decision-making

The above is suggestive of just how deeply this particular cultural form is implicated by the presence of data and analytics – which in turn is suggestive of how metrics and biometrics are intensified by digitalisation processes (as discussed by Ajana, 2013). We can use this as the base from which to observe the broader industry of analytics that has emerged in football. Indeed, the presence of the data solutions industry in sport offers further insight into the intensification of the role of metrics in culture. Returning to the central themes of this article, what is interesting here is not just the data assemblage itself but how it is described, marketed and presented.

We can begin with the Football consultancy company Soccernomics. This particular organisation is illustrative of the broader emergence of an industry of data analytics and data solutions (see Beer, 2013: 101–121). Soccernomics, who use the tagline 'Consultancy, Research, Ideas', describe their practices as follows:

We use data analysis to help clubs and national federations improve performance and save money. By finding hidden truths in the numbers, we can determine which players and coaches are over-performing, helping your club find value in recruitment. Our penalty analysis, based on game theory, has been used in FA Cup, Champions League and World Cup finals. (taken from <http://www.soccernomics-agency.com/> November 2013)

Reflecting the Moneyball approach, here we can see directly how data and analysis are being presented to football clubs and how the options they offer might be deployed. Data analysis here is depicted as the means

by which greater efficiency might be achieved. It is presented as the means by which performance is improved whilst efficiency also increases (echoing the use of a ‘performativity’ equation as a legitimising tool as described by Lyotard, 1979). In this instance, data analysis is charged with finding ‘hidden truths’, which might then expose where value is to be found. Again, we have the sense that data analysis has the capacity to reveal patterns or forms of knowledge that are not possible with human agency alone. Also here we see that decision-making is intended to be swayed and shaped by data analysis – which player, which coach, how to take penalties, and so on. The image produced is the one in which data analysis transcends the capacities of individuals and provides new types of agency that can be called upon to get decisions right (potentially in self-reinforcing ways).

Soccernomics though does not represent an isolated example, far from it. Perhaps a better-known example in terms of the media coverage it has received over the last decade is Prozone. According to their marketing materials at the end of 2013, Prozone were:

Established in the UK in 1998, Prozone have been pioneering the use of performance analysis in football for over a decade and in that time we’ve worked with some of the leading coaches in the world of sport. We now have offices in the USA, Spain, UAE, India and Japan and offer the world’s leading performance analysis service.

Here we get an impression of both the length of time in which data analysis has been finding its way into football and also the apparent global spread of such practices. Again, their accounts of their services focus upon the potential for enhanced decision-making and for finding patterns in data that lead to improved performance and greater efficiency.

Similarly, from the 2013 marketing materials, Prozone claim that:

From the flexibility offered by our real-time, self coding analysis products to the depth and accessibility of information delivered by our post-match and opposition analysis services, we’re constantly breaking new ground and setting the standard for what can be achieved with objective and reliable performance insights.

The suggestion here is that there are new developments and new types of analysis that are being developed and honed in order for decisions to be more ‘objective’ and for performance to be more ‘reliable’. Such an approach to data and metrics is seen to offer objective decision-making which outstrips the more subjective understandings of individuals. As Porter

(1995: 8) has explained, a ‘decision made by the numbers ... has at least the appearance of being fair and impersonal’. What Katherine Hayles (2006) has called the ‘cognisphere’ begins to mesh with decision-making processes and stretch them out across human and machine agency. We are also presented here with a version of Louise Amoore’s (2013) ‘politics of possibility’, with data derivatives being used to imagine futures and make predictions about what will work and what is possible. In this instance, Prozone are known for offering football match analysis, for providing visualisations of games and performance, for tracking players, and for tracking team and ball movements through games, which in turn are then analysed in various ways. These practices and visualisations can be seen then to be implicated in this ‘politics of possibility’ to which Amoore refers, with various possible outcomes being drawn into current decision-making.

To enhance their credentials, and to also illustrate what a routine part of football data analysis has become, various endorsements are used in the marketing of these data solution services. These include the current Derby County and former England Manager Steve McClaren, as well as other international coaches. For instance, the following endorsement is illustrative of how Prozone’s analytics are now depicted as a routine part of the game itself:

PROZONE3 is a very useful tool for me and my staff. In a short space of time I can acquire key statistical information on teams and individuals as well as viewing that of our rival teams. For these reasons Prozone remains a product that is critical to the work of my team. (Ernesto Valverde, Former Manager Olympiacos FC, from Prozone website)

We have to acknowledge that this is an endorsement taken from the company’s own marketing, but it is nevertheless highly suggestive, along with the earlier accounts of coaching staff analysts, of how data analysis is embedded into the practices and production of football. Alongside this, it is also illustrative of how data analysis is presented as a norm and as a progressive move in this cultural sector. It indicates an attempt to present data analysis as a routine part of cultural production. Data analytics are used in the preparation for games, in understanding performance, in finding successful patterns of play, and it is part of how the team is coached and organised. We see here that data about football circulates back into the game itself, a process of data circulation that fits with broader patterns (see Beer, 2013).

As I have already indicated, the influence of data and analytics is not limited to the patterns of play on the field. Prozone also provide analytic services for

shaping decision-making around player recruitment, thus the make-up of the team becomes a product of data analytics. As they put it, 'Prozone RECRUITER is a game-changing online solution that enables teams to make considered technical scouting decisions informed by objective performance information'. Again, this is promoted as a more 'objective' and detached form of decision-making that sees beyond the subjective positions of scouts and coaches to reveal hidden value. Decisions are presented as being more 'considered' and 'technical'. This then is illustrative of how these forms of data and metrics are viewed and how their capacities are understood. The message is clear, data analytics lead to more objective decision-making which in turn leads to the discovery of hidden value, with the result being greater performance and efficiency.

In August 2014, it was announced that the video games company Sports Interactive, who are responsible for the popular *Football Manager* series of games, would allow Prozone to use their games database to inform their actual player scout analytics (BBC, 2014). The database behind these games was seen to be so accurate that it could be used to inform actual football transfer activity. Here the consumption of football in the form of a video game begins to blur with the actual production of the game itself, with those playing the game working from the same metrics as those producing and organizing the actual football teams and matches – which might conjure the image of a kind of hyperreal 'ludodrome' (Atkinson and Willis, 2007). These types of circulations add further complexity to our understanding of how metrics feedback into the social and cultural world, with consumption and virtual game play being integrated into systems of football production themselves.

Working on a similar time scale, thus suggesting that the escalation of metrics in sport intensified from the mid-to-late 1990s onwards, Opta were formed in 1996.³ As well as providing statistics to professional clubs Opta also provide data services to broadcasters, publishers, betting companies, sponsors and fans. This reveals the way that this data solution industry operates, providing data and data services for a range of different types of customers. 'Finding beauty in the detail' is Opta's tagline. It is also notable that they provide these data services for 40 different sports. We see here the scale of the use of data in culture, which goes far beyond football and is global in its reach – Opta have 140 employees across 10 countries – and weaves together the interests of bookmakers, fans and commentators as well as those of the actual clubs themselves. Again, the clubs are invited to use this data in 'scouting', 'recruitment' and 'performance' analysis or to prepare for upcoming opponents. Echoing the types

of services provided by the other providers, Opta emphasize the scale and detail of their data, which is described as both 'live' and 'archived' as well as being 'fast' and 'robust'. Indeed, the focus is upon the speed of the analysis and how comprehensive the archive of data is. Opta emphasize the 'authenticity' and 'credibility' of the data, which is provided in ways that 'illuminate' and 'inform' or to provide 'sensational facts'. As well as the detail of the data, again the accessibility of the visualisations is a core component of the services, with 'graphical overviews' and 3D graphics with 'virtual angles' all providing users with variegated visual insights. Again, media companies and football clubs fans are also invited to be their own analysts and to use these 'immersive' data, with live match day event centres that are available on mobile phone platforms. It would seem that data solutions and analytics in the cultural sphere are deeply embedded in the industry as a whole.

The types of performance data feeds that Opta provide gives a sense of the intensity of the data that is being extracted – this simply was not available before the data assemblage escalated from the late 1990s.⁴ Opta offer three tiers of performance data feeds; these vary in their complexity and detail. Across a range of national football competitions – and again it should be noted that this goes beyond football and into other sports – they capture data on 'every on-the-ball contact'. For every 'event' they log a series of 'descriptors' that include 'pitch co-ordinate, a player and team reference plus a time stamp'. The result of using these 'variables' is a range of statistics about the game. Opta suggest that this level of detail means that they can separate out different 'types of pass', tell which tackles were 'goal-saving' or that 'regained possession in the final third'. They can even, they claim, tell what type of shot has been hit at goal and provide comparisons. Clearly then we have here an advanced data assemblage and analytics industry that intensifies the presence of metrics in culture, both in terms of its production and its consumption (through broadcasters, print media and even directly to the fans).

Of course, these discussions of metrics in football force us to ask questions about what might be understood to be the immeasurable parts of football or aspects of performance that are not easily quantified. It is possible that the types of performance, practices and actions that are captured by the data and that are therefore easily measured are those that then become valued (Adkins and Lury, 2012: 20; Badiou, 2008: 2). In other words, the data that are captured define what is deemed to be of value. Other practices, which may be successful but are not captured easily by the data, are then potentially sidelined. We might imagine that there are some involved in these organisations that would

resist the usurping of their own intuition in making such decisions. In his recent autobiography, to pick an example, the former footballer and manager Roy Keane (2014) used such systems but raises some questions about the use of statistics and the limitations they present for the judgment of coaches and managers, which is one amongst other indicators of a defence of human agency in decision-making even if this is ultimately reinforced through metrics. Furthermore, in terms of a game like football we might wonder how artistry, creativity, unorthodox play and expressiveness are measured or factored into such decision-making processes. There is no doubt that there are proxies for such things within these systems of analysis, but it is unlikely that this is enough for many of the protagonists – there is still plenty of scope for seeing how the extent of the faith in these analytics might vary. This type of question might be used to open-up what Luigi Doria has called the ‘problems of measure’ (Doria, 2013: 168) and the issue of ‘incalculability’ (Doria, 2013: 12). Such questions might even be used to explore the complex relations between ‘value and values’ that have been reasserted and rearticulated recently by Bev Skeggs (2014). Football, like other cultural forms, can be used to explore the tension that Skeggs’s levers open, with value in football, in monetary and organisational terms, clashing with the values of players and fans, which are often based around heritage, artistry and enchantment (elaborated in phrases like “they play football the way it should be played”, “they are a proper footballing side”, “x is a cultured player”, “x is an old fashioned No.10”, and so on).

Badiou (2008: 2–3) has argued that ‘number governs cultural representations’ and that it is ‘in its very essence that the cultural fabric is woven by number alone ... a “cultural fact” is a numerical fact’. This encourages us towards seeing ‘numbers’ as far-reaching and significant in cultural consumption. Numbers shape understandings of cultural representations, or so Badiou’s formulation would suggest, and those numbers also have the capacity to become facts. We have to consider how, as with football, culture more broadly is conceived, as well as produced, through numbers. The examples I have mentioned intimate outwards towards the presence of data and metrics, as Badiou hints, as being woven into the ‘cultural fabric’. The example of football presents opportunities for thinking about how we conceive of culture more broadly through number and what that means for the things that might go unknown.

Concluding thoughts

On the surface this article has explored how football is being reshaped through the presence of a growing data

assemblage and the analytics offered in the form of data solutions. It focused upon the role of data in the production and playing of football, with the suggestion that forms of measurement and pattern recognition are now central to the performance of footballers and the recruitment and organization of squads. Data are used to create an ‘information overlay’ (Mitchell, 2005) on the game itself. As in other spheres, we see data shaping as well as tracking behaviours. I’d like to begin this brief conclusion by emphasizing that this article is not just about football, rather it is implicitly about the wider uses and consequences of emergent forms of data, measurement and analytics in culture. The football case study is indicative of broader social shifts and the rising use of data and metrics in various social spheres. This is an article about the use of data and analytics to reshape the performance of the social, but it is also an article about how metricisation is described, presented and promoted in the discourse. What I have found here is that paying attention to a particular cultural data assemblage and cultural infrastructure, of which I have only touched the surface, reveals the way in which data circulate and reshape organizations, practices, behaviours and perceptions. As this case study intimates, these forms of data are already an integrated, immanent and embedded part of the social world, of our practices and of everyday cultural engagements. As Adkins and Lury (2012: 15) have noted, ‘social scientists are only just beginning to engage with this emergent political economy of data including the politics of measurement attached to it’. And as the case study described here suggests, this is no longer emergent but routine and embedded. Systems of measurement are not restricted to football, they are a growing part of contemporary society (for an account of this across various social spheres see Higgins and Lerner, 2010). Football is a useful example because it is instructive of the processes themselves and how they might continue to fold-back into the social. The consequences for agency, decision-making, notions of efficiency and the like were framed here in terms of Mirowski’s (2013) notion of ‘everyday neoliberalism’. The ideas highlighted through football begin to illuminate significant transformations in how the social world is organized, structured, ordered and performed through data and metrics. These transformations point to this embedded form of everyday neoliberalism, in both the formation of the data assemblages and how these technologies fold into culture.

To return to the introduction of this article then, football provides us with illustrative examples of ‘the politics of data circulations’ (Beer, 2013). It also provides further illustration of how data circulations reshape culture. We can readily see how metrics fold-back, in feedback loops, reconfiguring the structure and

form of the game itself, whilst also potentially reconfiguring how it is consumed. These are large-scale processes that have implications for football itself and for how it is appreciated. This is illustrative of broader cultural shifts and of the more general reshaping of everyday life by software, code, algorithms and data circulations. The job of sociology will be to unpick and attempt to understand the consequences and dynamics of these processes as they continue to unfold across different social spheres. We might try to locate such systems of measurement, efficiency and competition within broader political narratives. If we wish to place cultural forms within such broader concerns we need to begin with the material instantiations of data, metrics and analytics – both in terms of the technologies and systems of measurement and also in terms of the types of thinking that encourage their use and the rhetoric that facilitates their appropriation. To give one illustration of this, Will Davies (2014: xi) has argued that ‘uncertainty ... is a key concept for neo-liberalism’. One place to start would be to explore how a certainty in measurement creates uncertainty in those being measured.

The developments I have described in this article are not all new, many are based within a fairly long history, but as Ajana (2013) has argued, these processes are intensifying as a result of digitalization and some broader cultural shifts towards the perceived value of data and measurement. These developments do not just have implications for this one game; instead these are questions that face the playing and understanding of the *social game* more broadly. What are often referred to as Big Data, or maybe digital by-product data, are not something that exist outside of the social world. They circulate through it, reshaping it, altering and disrupting the configurations of power and decision-making. These new types of data are an implicit and integrated part of how the social world is performed and enacted. Football is a useful example for seeing just how deeply these data are a part of one particular cultural sphere, but the implications and questions I have outlined here reach far beyond football. They are actually, in my view, some of the most pressing questions that face social analysis today. The use of metrics in football is a particularly profound example of the ‘social life of methods’ (Ruppert et al., 2013), with analytics, visualization and statistical techniques used in the conduct and enactment of culture, yet it provides us with a series of issues and questions that might be applied to less data-centric cultural forms. I would like to conclude by briefly reflecting on some of these issues.

In this article, I have suggested that we can explore the presence of *productive measures*. These productive

measures are intensified and have new scales of possibility as a result of the growing data assemblage and industry of data analytics. Productive measures, we might conclude, are also responsible for producing as well as tracking the social. They shape behaviours. As people are subject to these forms of measurement they will produce different responses and outcomes, knowing, as they often will, what is coming and the way that their performance will become visible. Culture more broadly may be subject to the equivalent of the simple short pass to a fellow player.

Based on the case study used in this article and some of the points from the key academic literature, we might draw together some closing observations about these productive measures. The first is that by thinking of productive measures we are likely to develop an interest in revealing the varying extents of the faith placed in metrics. The extent of this faith in football and elsewhere is unclear at the moment, but it is clear that there are perceived values in such metrics (academics are likely to see a parallel set of experiences to footballers in this regard, see Burrows, 2012). The thriving industry of analytics shows that there is something of a burgeoning faith in numbers in football at least, if not sport more generally. Second, we can see that the aim of a productive measure is to locate and illuminate hidden value, to find things in the data that cannot be seen otherwise and to exploit them. Metrics are seen to be productive in this regard, they are seen to make efficiencies, reveal truths and find value. Third, and relating to this, productive measures define (as well as track) what is valued and what are considered desired behaviours and practices. For the footballer it might be pass completion or final third entries, or whatever the buzz statistic of the day might be, for academics it might be journal articles in the right impact-factor journals and so on. By defining what is possible, data and metrics afford what Louise Amoore (2009) calls ‘lines of sight’. As such, and fourth, these productive measures are likely to set the rules, schema and frameworks that constrain and contain the social world. These rules of measurement are likely to be profound and to become the rules of the game itself. As Rob Kitchin (2014: 127) has noted, ‘people start to game the system in rational, self-interested but often unpredictable ways to subvert metrics, algorithms, and automated decision-making processes’. Here though the systems of measurement set the rules for engagement, even if they are ultimately resisted or subverted. Finally, and by way of summing up, productive measures exist to enable claims towards strategy, calculation and risk management. As such they are intended to limit possibilities and to reduce the chances of error. They are seen to be objective and are trusted, sometimes and maybe even often ahead of or in conjunction

with human agency and discretion. I would suggest that the discussions in this article, and the notion of productive measures, would lead us toward these issues and open them up for further exploration.

In understanding Big Data, or whatever we may wish to call it, we should begin with these cultural instantiations, such as football, and then develop an understanding of the part that they are playing in the formation of social, political and cultural developments of different types. As with other neoliberal formations, in football we can see how the ‘capacity to quantify, distinguish, measure and rank’ is central to navigating ‘constant, overlapping competitions’ (Davies, 2014: 30). The cultural data assemblage we have only begun to unravel here illustrates the scale to which these systems can measure and rank in multifarious and detailed ways. Questions of data, metrics, analytics and number in the cultural sphere are not marginal, rather they are central to contemporary cultural formations. This article is intended to work towards an analysis of culture that attempts to understand this presence and to place it within a broader social and political context – namely one in which questions of measurement are tied closely to questions of power and processes of ‘variegated neoliberalization’ (Brenner et al., 2010). And more broadly, as Stuart Elden (2006) has demonstrated through the work of Heidegger, politics, number, measurement and calculation are deeply inter-related. Culture, and popular culture, can be found at the forefront of these developments, both in terms of the infrastructures and assemblages of data and measurement and as the location of the everyday ‘brushes’ with neoliberalism that Mirowski (2013) has deftly opened-up for analysis. Examples of everyday cultural forms, like football, have the potential to enable a granular analysis of the measurement and calculation of life, people and experience. Using Mirowski’s (2013: 92) work we can see everyday ‘neoliberal attitudes, imaginaries, and practices’ in the production of this global cultural form. These cultural forms, I would suggest, give us focal points for unravelling and understanding the politics of data circulations and the place of number in contemporary social life.

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Notes

1. The four teams discussed in this section are Manchester City, Liverpool, Chelsea and Arsenal. The information has

been drawn from public sections of their official club websites, which include different levels of detail about their staffing, club organizational structures and their use of data analytics.

2. These two clubs were York City and Burton Albion. Again, the information used here was drawn from public sections of the official club websites.
3. The information here is drawn from the Opta company history, which is available at <http://www.optasports.com/about/who-we-are/company-history.aspx#>. It also draws upon a series of downloads about the services that Opta provide, which are listed at <http://www.optasports.com/who-we-work-with.aspx>
4. The information here is drawn from Opta’s information about its performance data feeds which are detailed at <http://www.optasports.com/en/services/media/data-feeds/performance-data-feeds.aspx> and which were taken from the information download which is available at <http://www.optasports.com/media/836304/final-opta-coverage.pdf>

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